
APPRAISAL REPORT
Woonsocket, Rhode Island
Blackstone River

Local Flood Protection

October 1985



US Army Corps
of Engineers
New England Division

APPRAISAL REPORT
LOCAL PROTECTION PROJECT
WOONSOCKET, RHODE ISLAND

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I. INTRODUCTION

A. Background

The city of Woonsocket, Providence County, Rhode Island is located on the Blackstone River at its confluence with the tributary Mill and Peters Rivers. The mouth of the Blackstone River is about 12 miles downstream in Pawtucket, R.I. where it joins the Seekonk River before emptying into Providence Harbor and Narragansett Bay.

The Woonsocket Local Protection Project (LPP) actually consists of two damage reduction works: the Upper and the Lower Woonsocket Projects. The Upper Woonsocket Project was authorized by the 1944 Flood Control Act, as amended; and the Lower was authorized by the 1960 Flood Control Act, as amended. Other flood damage reduction projects within the Blackstone River Basin include the Worcester Diversion near the river's headwaters, the West Hill Dam on the tributary West River, and an LPP along the Blackstone River in Blackstone, all of which are in Massachusetts.

B. Authority

This study was accomplished under authority derived from EC 11-2-147 which provides direction to review the adequacy of completed LPP's which were specifically authorized by Congress. Development in watershed areas and new information on basin hydrology since the project's construction may warrant an updated analysis of the degree of protection being realized. The objective is to determine whether it is advisable to modify the structure due to changes either in the area being protected or to make changes to the project to improve its viability, safety, and reliability.

C. Purpose and Scope

The purpose of this investigation is to assess and document the adequacy of the existing LPP on the Blackstone and the tributary Mill and Peters Rivers through Woonsocket, Rhode Island, and determine if modifications are advisable and warrant further Federal study.

The study process is divided into two phases - reconnaissance and feasibility. In reconnaissance, modifications to the project are screened from the standpoints of economic, environmental, and engineering integrity and safety considerations. The detail used is strictly at the level of initial appraisal. Items of local cooperation, both past and future, are addressed when an affirmative action is recommended.

If warranted, the feasibility phase would detail the actual modification alternatives and recommend a particular course of action. The recommendation would be based on a comparison of each alternative's expected accomplishments.

The scope of this particular report is of a reconnaissance nature. The objectives are:

- Compile existing information
- Establish the need for modification
- Identify modification opportunities
- Determine preliminary feasibility of modifications
- Recommend future course(s) of action

D. Public Coordination

On 15 November 1984, personnel from the New England Division (NED) inspected the projects and visited the areas being protected. Discussions with the city's Planning Director were held regarding any future plans for the areas currently afforded flood protection and other sections of the city in the flood plain.

E. Other Studies

The most recent semi-annual inspection of the LPP was conducted on 1 May 1985. The project is in satisfactory condition and capable of performing its intended function. However, there are numerous deficiencies, described in more detail later, which require corrective action.

The Federal Emergency Management Agency's Flood Insurance Study (FIS) became effective 6 July 1981 when the city of Woonsocket joined the regular portion of the National Flood Insurance Program.

In June 1977, NED completed a situation report for the two Woonsocket flood damage reduction projects. The scope of that study was similar to this report's. It was concluded that both projects were operating adequately and functioning in accordance with design and construction. The Woonsocket LPP met the needs and desires of local interests at that time (1977) and no further studies were recommended.

II. EXISTING CONDITIONS

A. Project Area

1. Description

The city of Woonsocket is located in northeast Providence County on the Rhode Island-Massachusetts border, about 14 miles northwest of the city of Providence. Woonsocket is bordered by the town of North Smithfield on the west and southwest, the town of Cumberland on the east and southeast, and by the Commonwealth of Massachusetts to the north. The incorporated area of the city is 7.9 square miles and the 1980 U.S. Census count was 45,914.

A visit to the city's flood plains and flood protected areas revealed that there has not been any significant development since the construction of the projects. In addition, much of the activity in the areas currently offered flood protection is not as intense as when the projects were built. Many industrial and commercial properties have changed occupants with a general trend toward "lighter" uses, such as warehousing and service related businesses.

2. Hydrology and Hydraulics

The Blackstone River watershed itself is located in south-central Massachusetts and northern Rhode Island. It is generally elongated in shape, with a length of about 46 miles and an average width of only 14 miles. The total drainage area of the basin is 540 square miles with 416 square miles above the USGS gage in Woonsocket, downstream of the Mill and Peters Rivers.

The Mill River watershed has its source at North Pond in Milford, Massachusetts and flows in a southerly direction to its confluence with the Blackstone River in Woonsocket. In its 18-mile length, the Mill River has a fall of about 230 feet of which 23 feet occur in its one mile reach within Woonsocket. The Mill River has a drainage area of 34.7 square miles consisting of low rolling wooded hills and broad valleys with scattered lake and swamp areas. Several dams on the Mill River within the city of Woonsocket were destroyed during the August 1955 flood. The largest was the 36-foot high Harris Pond Dam, since reconstructed, located on the Massachusetts-Rhode Island border.

The Peters River watershed originates at the outlet of Silver Lake which is located about four miles northeast of Woonsocket in the town of Bellingham, Massachusetts. It flows in a general southwesterly direction to its confluence with the Blackstone River at Woonsocket and drains an area of 12.7 square miles.

The climate is typical of the North Temperate Zone having a mean annual temperature of approximately 50 degrees Fahrenheit. The mean annual precipitation is 43 inches having an annual snowfall of approximately 40 inches, though snowfall may occur in appreciable amounts from December to March.

A summary of drainage area-peak discharge relationships for the three rivers are shown in Table 1, "Summary of Discharges."

Table 1
Summary of Discharges
Woonsocket, Rhode Island

Flooding Source and Location	Drainage Area Drainage Area (sq. miles)	Peak Discharges (cfs) Annual Chance of Occurrence			
		10%	2%	1%	0.2%
Blackstone River					
Manville Dam	430	10,170	17,300	22,400	40,700
Woonsocket Falls Dam	368	9,600	16,500	20,500	33,000
Mill River					
Blackstone River confluence	34.7	1,840	3,350	4,200	6,200
Harris Pond Spillway	34	1,470	2,590	3,100	4,600
Peters River					
Blackstone River confluence	12.7	750	1,150	1,600	2,600

3. History of Floods

Maximum discharges on the Blackstone, Mill, and Peters Rivers may be expected to occur during any season of the year, but are most likely during the spring months or in late summer or early fall. The conditions contributing to spring floods are well laid in advance during the winter months. Prolonged periods of low temperature and above normal snowfall is a signal that trouble from flooding is a strong possibility. The early spring rains combined with melting snow and a frozen ground surface give rise to peak spring runoff rates. It is quite possible under such conditions for the measured runoff from the basin to be more than 100 percent of the recorded rainfall. Heavy rainfall associated with hurricanes and tropical storms generate the flood flows that occur in late summer or early autumn.

Storms causing flooding by the Blackstone River date back to the early 1800's. Prior to 1936, records of destructive floods are incomplete, consequently, little can be said about the extent and characteristics of the flood problems of those early storms. With the

installation of various gaging stations along the river since 1934, recorded peak flows for the floods of March 1936, July 1938, August 1955, and March 1968 provide sufficient data for hydrological analyses to indicate that the August 1955 flood can be considered the greatest flood ever recorded on the river.

The event of August 1955 produced a peak discharge two times the magnitude of previous maximums and resulted from 8-12 inches of rainfall accompanying "Hurricane Diane". The ground was previously saturated by the precipitation of "Hurricane Connie" which occurred only a few days earlier. The maximum peak flow reached 32,900 cfs.

The flood of March 1936 had two peaks: the first was caused by rainfall combined with snow melt, and the second was caused by heavy rainfall. Heavy rains during the summer and fall months produced the November 1927 and July 1938 floods. These two floods and the March 1936 event were all about the same in magnitude (15,000 cfs) and prior to August 1955 they were the record floods on the Blackstone River. Since completion of the local protection works only the 1968 flood was as great to those experienced prior to August 1955.

B. Project Description

1. History

The two projects were both designed to provide complete protection to adjacent properties from a recurrence of the record August 1955 flood. The Upper Woonsocket Project was initiated in July 1956 and completed in April 1960. The Lower Woonsocket Project was started in December 1963 and finished in April 1967.

The Upper Woonsocket Project is located in northeastern Rhode Island, on the Blackstone River and extends from the South Main Street Bridge, in the center of Woonsocket, upstream 8,300 feet to the Massachusetts-Rhode Island border. Features include channel improvements, a reinforced concrete floodwall, earthen dikes with stone slope protection, a pumping station, and a tainter-gated dam which replaced the original Woonsocket Falls Dam. The Upper Woonsocket's first cost was \$5,435,500 in 1956. This included items of local cooperation (lands, easements, right-of-way, bridge alterations...etc.) amounting to \$1,171,000.

The channel improvements consisted of widening, deepening, and straightening the Blackstone River along the entire 8,300 feet and included the excavation or deepening of the rock spillway discharge channels through the arches of the South Main Street Bridge. About 1,300 feet of reinforced concrete floodwall and earthen dike are provided in the Singleton Street area. A pumping station, to provide for interior drainage and runoff from higher ground, was constructed within the enclosed area there. Stone slope protection is provided on the riverside face of the earthen dikes. The dikes and floodwall were designed to each provide 3-feet of freeboard above design flood levels.

The new Woonsocket Falls Dam consists of a 266-foot long concrete overflow section with four 50-foot long by 10.1-foot high tainter gates. In their normal operating position the gates are closed to maintain a pool elevation of approximately 148 feet NGVD. With the gates raised the spillway can pass the design flow of 30,000 cfs. The head pool would be about 153 feet NGVD under this condition. Other work included the replacement of a highway bridge, a railroad bridge and four sewer siphons. A second railroad bridge was modified to provide the required channel width.

The Lower Woonsocket Project is also located on the Blackstone River and provides protection against flooding from the Blackstone and the tributary Mill and Peters Rivers, within the limits of Woonsocket. It consists of approximately 6,000 feet of dikes and floodwalls, 2,850 feet of channel improvements, two pumping stations; and included modifications to a footbridge, the removal of the two dams, plus other utility works. Provisions for containing the Peters River through Woonsocket to its confluence with the Blackstone consist of dikes and floodwalls leading to a 10 by 17-foot pressure conduit. The Mill River is similarly contained by twin 12 by 12-foot pressure conduits with dikes and walls leading to the conduits' entrance. The lower Woonsocket project's first cost was \$8,302,319 in 1963. Items of local cooperation were similar to the upper project and amounted to \$435,000.

A man-made type obstruction located at the entrance to the Peters River conduit has been identified as a potential threat to the Lower Woonsocket project's function. This structure was formed with the stone from nearby slope protection by vandals. The city was directed to remove the obstruction and restore the dike protection to assure the project operates for flood damage reduction as designed.

A trash rack to allow for easier maintenance of the Mill River conduit was installed. Interior runoff was ponding and reducing the effectiveness of the project prior to this.

2. Damages Prevented

The Woonsocket Local Protection Projects have prevented nearly \$36 million in flood damage since their construction. The two most recent flooding events in the Blackstone River Basin were in April and May/June 1984. The method by which potential flood losses attributable to the two LPP's is determined by comparing observed flows, with the West Hill Dam in place, to computed natural flows that would have occurred without West Hill Dam.

Table 2 indicates that approximately \$8.5 million in losses would have occurred in Woonsocket from the two storms in the absence of flood protection offered by the two projects and West Hill Dam. In fact, no damage was actually sustained at all. Approximately 45% of the potential damages were prevented by the West Hill Dam and 55% by the LPP's. Of the

portion prevented by the LPP's themselves, nearly 75% was prevented by the Upper Woonsocket measures alone.

Table 2
1984 Damages Prevented
WOONSOCKET LOCAL PROTECTION PROJECTS
Blackstone River Basin, Rhode Island
(AUG 1985 P.L.)

<u>Event</u>	<u>LPP</u>	<u>Observed Conditions</u>		<u>No-Project Conditions</u>			<u>Damages Prevented</u>	
		(cfs)	(Damages)	<u>Start of Damage</u> (cfs)	<u>1984 Floods</u>		<u>West Hill Dam</u>	<u>LPP's</u>
					(cfs)	(Damages)		
Apr	UW	7000	\$1,695,800	7000	7800	\$3,155,900	\$1,460,600	\$1,695,300
Apr	LW	9500	\$619,900	10,000	10,300	790,900	171,000	619,900
May/ Jun	UW	7000	\$1,695,300	700	8000	3,448,000	\$1,752,800	1,695,200
May/ Jun	LW	9500	644,100	10,000	10,800	<u>1,072,100</u>	<u>408,000</u>	<u>664,100</u>
			TOTALS			<u>8,466,900</u>	<u>3,792,400</u>	<u>4,674,500</u>

1/ UW - Upper Woonsocket Local Protection Project
LW - Lower Woonsocket Local Protection Project

The areas of the city protected from flooding are comprised of light industrial and commercial activities and some residential development. Without the construction of the flood protection, an event of the same magnitude would cause losses estimated at \$8.8 million for upper Woonsocket and \$7.1 million for lower Woonsocket in 1955 prices.

3. Level of Protection

Both flood damage reduction projects in Woonsocket were designed against a Standard Project Flood (SPF). The dikes and floodwalls of each provide three feet of freeboard.

The Upper Woonsocket project provides protection against flood stages on the Blackstone River. The project design flood is 30,000 cfs. Although preventing inundation from an event having a 1% chance (100-yr recurrence interval) of annual occurrence, the 0.2% (500-yr) flood would damage a number of commercial and industrial properties.

The Lower Woonsocket project provides protection against flood stages on the Blackstone River and the Mill and Peters Rivers. The project design flood on the Blackstone River above its confluence with the Mill and Peters River is 33,000 cfs; below, it is 40,000 cfs. The design flood is 8,500 cfs on the Mill River and 3,200 cfs on the Peters River. Dikes and floodwalls along the Blackstone, Mill and Peters Rivers through here can prevent flooding from an event even rarer than one having a 0.2% annual chance of occurrence.

4. Recent Inspection

The most recent semi-annual inspection for the Woonsocket LPP was conducted on 1 May 1985. The project is in satisfactory condition. However, there are several items which require attention:

- The Singleton Street pumping station pumps need testing and its outlet cleared of debris.

- The removal of a man-made obstruction and waterborne debris at the Peters River conduit intake.

- The removal of trees and shrubs in the retaining wall on the southwest side of Woonsocket Falls Dam before stones from the retaining wall are dislodged.

- Missing rock slope protection at the outlet in the Hamlet District area should be removed from the channel and replaced on the slope.

III. Future Conditions

A. Land Use

1. Economics

The economic justification of both projects was based on flood damage surveys of the 1955 flood. The Upper Woonsocket project protects an area which was characterized as heavily industrialized. Nearly three-quarters of the properties destined to be protected by the project were industrial and about one fifth were utilities and highways. Twenty industrial properties, consisting of 10 textile, 2 bulk oil, 2 machine tool, 2 rubber, 1 clothes and 3 fabric manufacturing establishments were expected to benefit from the project. Some 95 percent of the economic justification was based on the reduction of flood damages and 5 percent on more intensive use of the properties after the project's implementation

The flood of 1955 caused about \$12.3 million in damages to an estimated 270 acres in the highly developed and thickly settled area of Lower Woonsocket. Some 300 buildings were affected. Commercial and residential damages, accounting for about 45 percent of the total, were particularly severe in the heart of the Social District as a result of the combined flooding of the Blackstone, Mill and Peters Rivers. An estimated 25% of the losses affected 20 industrial concerns.

Table 3
Woonsocket Local Protection Projects
Economic Characteristics
(1955 Price Level)

<u>Year Completed</u>	<u>Upper Woonsocket</u> 1961	<u>Lower Woonsocket</u> 1967
<u>Experienced Flood in 1955</u>		
Total Actual Losses (\$1000)	N/A	\$12,330
Distribution of Losses		
. Urban residential & commercial	7%	45%
. Industrial	73%	23%
. Utilities and Transportation	20%	32%
<u>Recurrence of 1955 Flood (\$1000)</u>		
Total losses	N/A	\$10,200
Avoided Losses due to LPP's	\$8,800	6,140
Avoided Losses due to West Hill Dam	N/A	3,050
Residual Losses	zero	1,010
<u>Annual Benefits</u>		
Total (\$1000)	\$450	\$235
Distribution of Benefits		
• Flood Damages	95%	60%
• Increased Utilization/Enhancement	5%	40%

N/A = not available

A review survey in early 1963 of the Lower Woonsocket project found that land and buildings unoccupied at the time of the original 1955 survey had been put to use before the completion of the protection in 1967. Taking into account the differences in price levels between 1955 and 1963, total benefits directly attributable to the project were not significantly different for the two surveys. However, the 1963 survey showed a shift in expected benefits. Flood damage benefits were increased from 60 to 86 percent and those due to more intensive land use were correspondingly reduced from 40 to 14 percent.

The analysis indicates that the 1955-63 period was one of growth for the Lower Woonsocket project area. Available information does not indicate that a similar survey was done for the Upper Woonsocket protective measures.

In October 1974 C.E. Maguire, Inc. conducted an investigation entitled, Water Resources Development Study, Blackstone River Watershed, Massachusetts and Rhode Island to determine the changes in potential flood damages in the two LPP areas due to changes in land use in the Blackstone River flood plain. Field investigations between 1968 and 1973 were conducted to revise the flood damage data base.

The study showed no significant damage potential remaining in the Upper Woonsocket project area because the profile of the recurring 1955 flood had been lowered through this reach by as much as 10 feet due to channel improvements of the said project and also upstream in Blackstone, Massachusetts and because of the construction of West Hill Dam.

Regarding the Lower Woonsocket project, the Maguire study indicated that in the absence of the flood protection measure there, a recurrence of the 1955 flood would cause \$7.7 million (1955 price level) in damages: 64 percent commercial and residential, 11 percent industrial and 25 percent utilities and transportation. These reflect a decrease in damages from earlier estimates, and a shift since 1955 to commercial and residential damages from 45 to 64 percent, respectively. The study concluded that the Lower project, aided by a 1955 flood profile reduction of 3 to 5 feet from West Hill Dam, has virtually eliminated the possibility that the river will overtop its banks again.

A cursory field inspection of the Woonsocket floodplain did not reveal any significant new developments since the projects were completed. Land use has primarily shifted from industrial to commercial uses.

In general, the Upper Woonsocket area exhibits a higher degree of property utilization and less abandonment than the Lower Woonsocket area. A transport company has been established on the flood plain between Canal Street and the Blackstone River, and several formerly industrial complexes have been converted to light industrial and commercial uses.

Concerning the Lower Woonsocket project, building conversions were noted on the left bank of the Blackstone River to the south of the Woonsocket Falls Dam. Recreational land use has become significant in the Mill River area. Several of the formerly industrial buildings on School Street have been abandoned or converted to commercial use.

With a recurrence of the 1955 flood the Upper and Lower projects would prevent flood losses respectively of \$44.6 million and \$31.1 million in 1985 prices.

2. Community Plans

The protected area is made up of primarily industrial/commercial type development. This area is fully developed, with little room for future growth. Discussions with the city planner found that Woonsocket does not have any specific strategy for the floodplain. Current use is a strong indicator of future use. Any changes that might occur would be expected to be a less intensive land use.

B. Project Integrity

The existing protective works have performed the intended purpose over their life to date.

IV. CURRENT PLANNING AND DESIGN CRITERIA

A. Freeboard

1. Requirements

There are no specified criteria with regard to the design level of protection for flood damage reduction projects. Each project must be complete within itself and provide the maximum net benefits, unless there is overwhelming justification to deviate. In urban areas the Standard Project Flood (SPF) is a design goal since potential overtopping or failure could be catastrophic. An SPF's chance of annual occurrence varies regionally, but could be as frequent as an event having a 0.5 percent annual chance.

Engineering regulations call for freeboard allowances above design grade of 2 feet for concrete walls and 3 feet for dike or levee systems. The Woonsocket LPP conforms to this criteria.

2. Benefits

Current planning guidance allows for taking credit for expected benefits within the bottom half of the freeboard range. In the case of the Woonsocket LPP, any expected benefits are considered insignificant because current land use offered flood protection is not as intense as when the LPP was built.

EM 1120-2-104 outlines the procedures regarding benefits for advance replacement of existing projects and features. A credit can be taken for extending the life of a project or feature and realizing benefits beyond which it would have continued to function. For example, the Upper Woonsocket LPP is 21 years old and any modifications that would extend its physical life may take advance replacement benefits. However, an engineering analysis of the structure's stability and integrity would have to be accomplished to determine just how much longer the LPP can be expected to perform its intended purpose, since advance replacement benefits can only be attributed for the period of time after the structure would naturally be unable to provide flood protection. This study does not address issues of this type.

V. MODIFICATION OPPORTUNITIES

A. Level of Protection

Opportunities to increase the level of protection of the Woonsocket projects are limited. Both projects provide SPF protection with three feet of freeboard. A higher level of protection is not warranted.

B. Protected Area

Inspection of the areas downstream and upstream of the existing projects indicates extension of the protection is not needed at this time.

C. Project Features

Items noted as being deficient in the recent inspection should be attended to for assurance of project purpose.

VI. CONCLUSIONS

An increased level of flood protection or extension of the protected area at the Woonsocket LPP is not needed at this time. The projects themselves are in good condition and expected to continue to perform their intended purpose.

VII. RECOMMENDATIONS

Modifications to increase the level and extent of flood protection at the Woonsocket LPP are not recommended at this time.

Removal of debris at project features by the city of Woonsocket is recommended. Its continued presence could introduce a safety risk to the public.

VIII. ENCLOSURES

Jim MicRocco

June 4, 1985

Operations Division, Project Operations Branch

Honorable Gaston A. Ayotte, Jr.
Mayor of the City of Woonsocket
Woonsocket, Rhode Island 02895

Dear Mayor Ayotte:

My representatives conducted the semi-annual inspection of the Federally built local flood protection project in Woonsocket on May 1, 1985. I have enclosed detailed inspection reports of the Upper and Lower sections of the project for your review.

The project is in satisfactory condition. However, there are several deficiencies, noted on the reports, which require your attention. Of primary concern is the removal of a man-made dam, formed with stone from the slope protection, at the Peter River conduit intake and the restoration of the slope protection. There is also a large amount of water borne debris at the intake which must be removed as we have noted in previous reports. As a follow-up to your recent brush clearing efforts at the East School-Street Station, you should initiate a herbicide application program to eliminate future growth. I also recommend that immediate action be taken to seal or remove the deteriorated asbestos exhaust wrapping at the Hamlet Pumping Station to prevent operator exposure.

I want to thank Messrs. Milewski and Greenough for their cooperation during the inspection. If you require any technical assistance in the operation and maintenance of your project, please call me at (617) 647-8411 or Mr. Robert Hanacek, Thames River Basin Manager, at (617) 987-0108.

Sincerely,

Enclosure
as stated

J. C. WONG
Chief, Project Operations Branch

Copy furnished:

Mr. Hedley Patterson
Division Engineer
Department of Public Works
Woonsocket, Rhode Island 02895

Mr. Steven Milewski
City Inspector
Department of Public Works
Woonsocket, RI 02895

Mr. Edward T. Tracey, Regional Engineer
Federal Energy Regulatory Commission
New York Regional Office
26 Federal Plaza, Room 2207
New York, New York 12078

✓ Basin Manager, TRB
West Hill Dam
Ops. Div. File

LOCAL FLOOD PROTECTION PROJECT INSPECTION REPORT

Project: WOONSOCKET, RHODE ISLAND LPP (LOWER)

Maintaining Agency:

Type Inspection: X Semi-Annual Staff 90 Day Interim

River Basin: BLACKSTONE

Date of Inspection 1 MAY 1985

Feature	Sat	Unsat	Deficiencies
PUMPING STATIONS - STRUCTURES			
INTERIOR	X		
EXTERIOR	X		
PUMPS - MOTORS - ENGINES			
TRIAL OPERATED	X		
GENERAL CONDITION	X		
POWER SOURCE	X		
INSULATION TESTS	X		
METAL INTAKES/OUTLETS	X		
GATE VALVES	X		
GATES - DRAINAGE STRUCTURES			
TRIAL OPERATED	X		
GENERAL CONDITION	X		
LUBRICATION	X		
DIKES - DAMS			
GENERAL CONDITION	X		
SLOPES/EROSION	X		
SAND BOILS/CAVING	X		
TRESPASSING	X		See Attached Sheet
SLOPE PROTECTION	X		
DRAINS	X		
STOP-LOGS - LOG BOOM			
			N/A
CONDITION OF LOGS			
AVAILABILITY OF LOGS			
HIGHWAY SLOTS			
STORAGE FACILITIES			
CHANNELS - OUTLET WORKS CHANNEL			
BANKS			See Attached Sheet
OBSTRUCTION CONTROL			

Feature

Sat Unsat

Deficiencies

CONCRETE STRUCTURES

SURFACE	X		See Attached Sheet
SETTLEMENT	X		
JOINTS	X		Caulking Bad - See Comments
DRAINS	X		

MISCELLANEOUS

EMERGENCY OPER. PLAN	X		
EMERGENCY EQUIPMENT	X		
SEMI-ANNUAL REPORT	X		

Inspection Party: Steve Mileski, City Inspector, City of Woonsocket, RI
 Jerry Greenough, Engineer Class II, City Woonsocket, RI
 John Finnerty, West Hill Dam, Corps of Engineers
 Robert Hanacek, Basin Manager TRB, Corpsof Engineers
 Ronald Tryba, Westville Lake, Corps of Engineers

Photographs Taken:

None

Remarks & Additional Comments:

(Indicate Here Observations, Discussions, Specific Feature
 Deficiencies, Recommendations and any other pertinent information.
 Use Continuation Sheet if necessary.)

See Attached Sheet

X ALL APPLICABLE ITEMS. IF UNSAT INDICATE SPECIFIC DEFICIENCIES. INDICATE IF NOT APPLICABLE.

DATE

INSPECTED BY: TYPED NAME & TITLE

SIGNATURE

1 MAY 1985

Robert Hanacek, Basin Manager, TRB



LOWER WOONSOCKET LOCAL PROTECTION

Inspected 1 May 1985 with the following comments:

East School Street Area (near State Park)

- Several small 6' trees and shrubs park side of dike should be removed.
- Barb wire fans still require repair as noted on last reports - same
- Vegetation from Mass. line to tunnel intake extensively cleared of woody vegetation summer 1984 - still looks good. Suggest on herbicide application followup.
- Channel debris removed - tunnel debris unknown
- Recommend followup with herbicide application on riprap slopes now that trees and brush have been removed.
- Floodwall joints around East School Street have lost resiliency, cracking. Spall, SE corner of floodwall downstream of bridge
- Plans to replace some riprap in the East School Street area noted.
- Serious foot/motorcycle erosion areas starting 8" deep X 24" wide park side of dike.
- SW bank across from park riprap depleted by vandals 12'X24" top of dike.

Social District (Blackstone River)

- Vegetation along riverside of pumphouse floodwall removed
- Erosion of rock slope paving - outlet Peters River conduit not inspected - noted in last report.
- Pump station - intake trash rack requires repainting (same as last report)
- Trash at intake holding area should be cleaned up to avoid clogging racks.
- All engines operated satisfactorily.
- Both wet well gates operated satisfactorily
- Both river gates operated satisfactorily
- Hours on pump engines
 - No. 1 473.3
 - No. 2 440.8
 - No. 3 406.7
- Sump pump operated OK
- Furnace repaired - new motor

NOTE: Difficulties in losing air pressure on air start systems when engines don't turn over could be handled through converting to air start with an air reservoir connected to all three engines or an electric start system. Interconnecting present system is not recommended (see letter 10 January 1984 to Mr. Patterson from Project Operations Branch).

Peters River Inlet - rock dam still there, four shopping carts, logs, tires and trash, brush growing on riprap both sides - fence broken on N side floodwall.

Hamlet District (Blackstone River)

- Trash racks need repainting (noted on last two reports)
- Vegetation in intake holding area requires clearing (noted in last two reports)
- Rock slope protection at outlet should be replaced and removed from outlet channel. Extensive sand and silt buildup at outlet and inlet should be cleared of stone.
- Flap gates should be checked periodically when water levels are low to insure operation as designed.
- Perimeter fence - 8' section down requires repair as previously noted
- Operation procedures well posted
- Pump drive engines:
 - No. 1 - 412.0 - operated, started satisfactorily; asbestos exhaust cover badly deteriorated near ceiling exposing operators to hazardous materials.

LOWER WOONSOCKET LOCAL PROTECTION (continued)

No. 2 378.6 - Operated, started satisfactorily.

No. 3 353.6 - Operated, started satisfactorily.

- Asbestos exhaust cover on engine No. 1 should be sealed or replaced immediately to avoid exposing employees to continued serious health risks as previously noted.
- Sump pump operated satisfactorily
- Exhaust fan operated satisfactorily
- Sluice gates 60"x60" (2) wet well trial operated - OK
- Sluice gates 60"x60" (2) intake trial operated - OK

LOCAL FLOOD PROTECTION PROJECT INSPECTION REPORT

Project: WOONSOCKET, RHODE ISLAND LPP (UPPER)

Maintaining Agency:

Type Inspection: X Semi-Annual Staff 90 Day Interim

River Basin: BLACKSTONE

Date of Inspection 1 MAY 1985

Feature	Sat	Unsat	Deficiencies
PUMPING STATIONS - STRUCTURES			
INTERIOR	X		
EXTERIOR	X		
PUMPS - MOTORS - ENGINES			
TRIAL OPERATED		X	See Comment #1
GENERAL CONDITION	X		
POWER SOURCE	X		
INSULATION TESTS	X		
METAL INTAKES/OUTLETS	X		
GATE VALVES	X		
GATES - DRAINAGE STRUCTURES			
TRIAL OPERATED	X		See Comment #2
GENERAL CONDITION	X		See Comment #3
LUBRICATION	X		
DIKES - DAMS			
GENERAL CONDITION	X		
SLOPES/EROSION	X		
SAND BOILS/CAVING	X		
TRESPASSING	X		
SLOPE PROTECTION	X		
DRAINS	X		
STOP-LOGS - LOG BOOM		N/A	
CONDITION OF LOGS			
AVAILABILITY OF LOGS			
HIGHWAY SLOTS			
STORAGE FACILITIES			
CHANNELS - OUTLET WORKS CHANNEL			
BANKS	X		
OBSTRUCTION CONTROL	X		

FEATURS

Sat Unsat

Deficiencies

CONCRETE STRUCTURES

SURFACE	X		
SETTLEMENT	X		
JOINTS			See Comment #4
DRAINS	X		

MISCELLANEOUS

EMERGENCY OPER. PLAN	X		
EMERGENCY EQUIPMENT	X		
SEMI-ANNUAL REPORT	X		

Inspection Party: Steve Milewski, City Inspector, City of Woonsocket, RI
 1-401-762-6400 ext. 182 (Headly Patterson)
 Jerry Greenough, Engineer Class II, City of Woonsocket, RI
 John Finnerty, West Hill Dam, TRB Corps of Engineers
 Robert Hanacek, Thames River Basin, Corps of Engineers
 Ron Tryba, Corps of Engineers, Westville Lake

Photographs Taken:

None

Remarks & Additional Comments:

(Indicate Here Observations, Discussions, Specific Feature
 Deficiencies, Recommendations and any other pertinent information.
 Use Continuation Sheet if necessary.)

See Attached Sheet

X ALL APPLICABLE ITEMS. IF UNSAT INDICATE SPECIFIC DEFICIENCIES. INDICATE IF NOT APPLICABLE.

DATE
 1 MAY 1985

INSPECTED BY: TYPED NAME & TITLE
 Robert Hanacek, Basin Manager, TRB

SIGNATURE

Robert Hanacek

WOONSOCKET, RHODE ISLAND LPP (UPPER)

COMMENTS

Woonsocket Falls Dam

- Generator started; switchover to emergency power good.
- Hours on generator 147.2, same as last inspection
- Tainter gates - all spin and drive gears lubricated
 - #1 - Painted summer 1983, indicator needle fixed but reads 4 1/2 open when fully closed (noted in last report).
 - #2 - Needs painting, last reported - opens from NE end, slightly uneven, check tension.
 - #3 - Needs painting, gauge indicator needle has been fixed to read properly, rust on catwalk behind cable drum.
 - #4 - Needs painting, last reported - center leak could not be checked, broken fence brackets - at left of entrance gate next to gate #4.

Singleton Street Pumping Station - Hours on pump engines #2 - 141.1, #3 - 131.3

Comment #1 - Neither pump could be started due to dead batteries. Request repair.
- Mule has not been operated in some time, Mr. Milewski has electrical powered tool to open gate at Social District pumphouse if mule fails to work.

Comment #2 - Intake gate should be operated and greased to insure parts are not frozen.
- Sump not operated
- Sump room in very good condition
- Silt buildup in intake channel should be removed (as mentioned in last report)

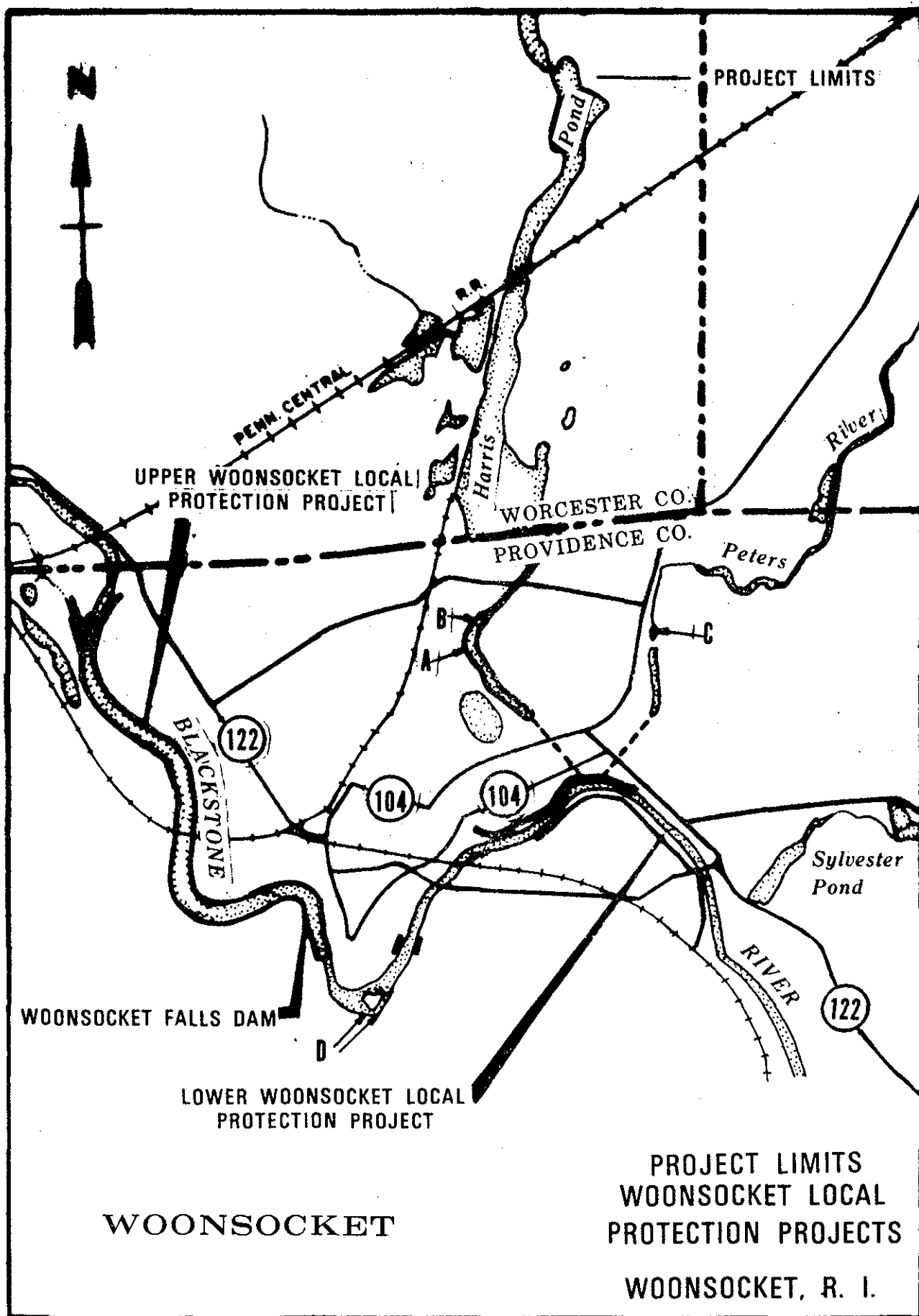
Comment #3 - Outlet to river - clogged with riprap and silt to 2/3 of it's original capacity. This seriously restricts the design capacity of the outlet and must be removed as soon as possible as requested previously.

Comment #4 - Minor spall noted under Singleton Street bridge.
- Caulking has lost resiliency in flood wall joints as noted in previous reports.

Comment #5 - Riprap being stockpiled at ballfield for use ATP along floodwall.

NOTE: Leakage around gate seals does not seriously impact on the flood control aspect of project. As noted in the 10 January 1984 letter from the Corps, Project Operations Branch. No gates operated to retain limited hydro pool above tainter gates.

Trees in retaining wall on SW side of dam upstream should be removed before they dislodge stones of retaining wall. Debris and trees downstream next to control house should be removed. Previous requests for action ignored.

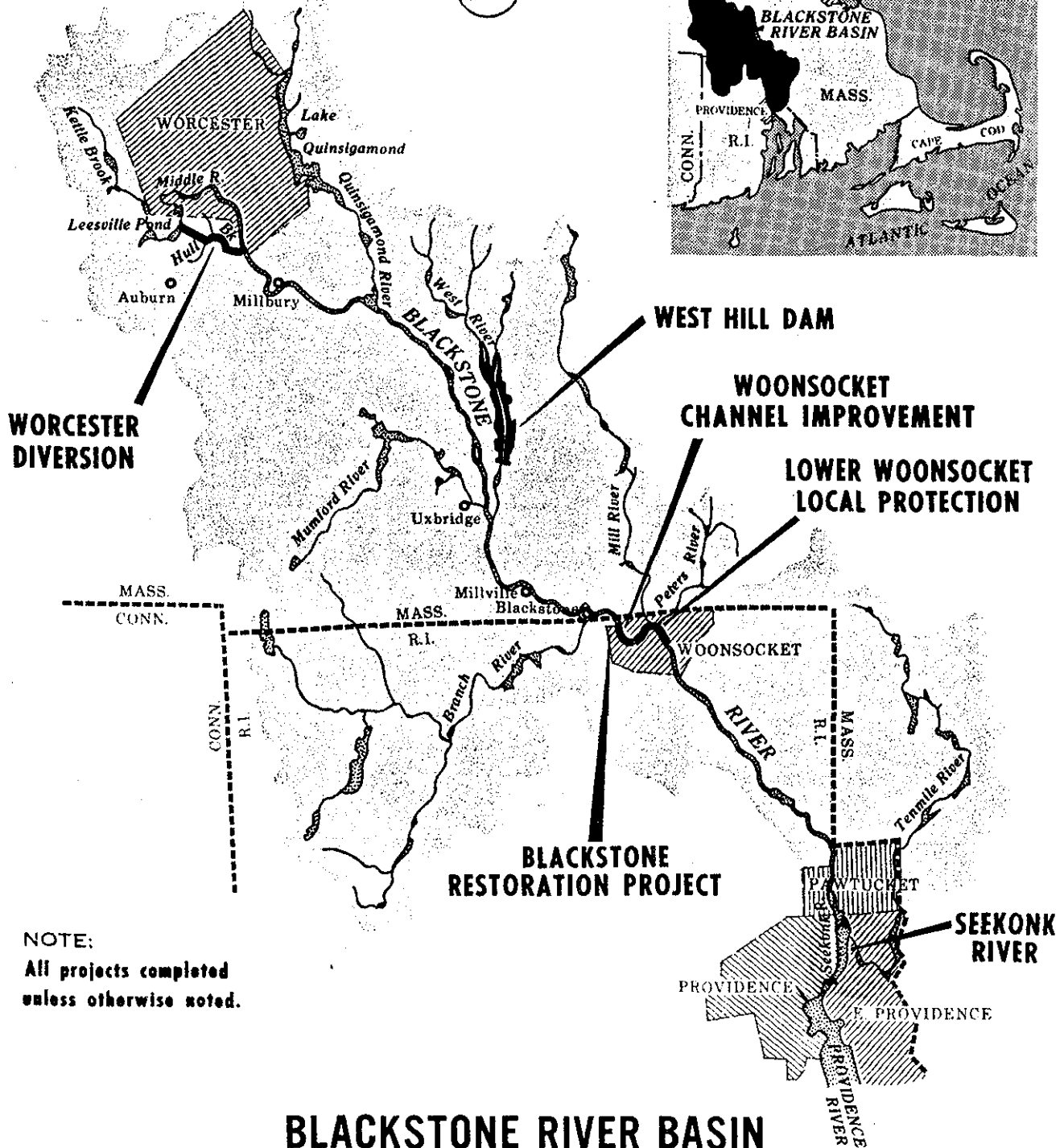
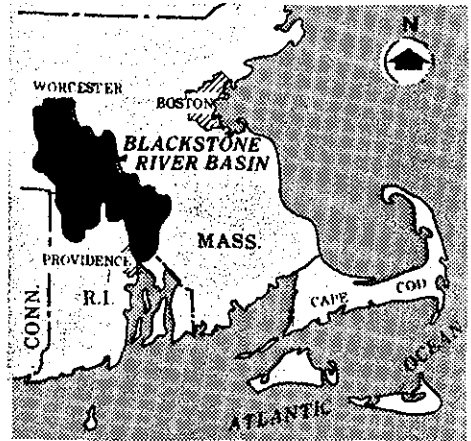


This map should be

NOTE: Delineation of streams on map is limited to major streams or to those having existing project or current study

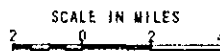
LEGEND

-  RESERVOIR
-  NAVIGATION PROJECT
-  LOCAL PROTECTION PROJECT

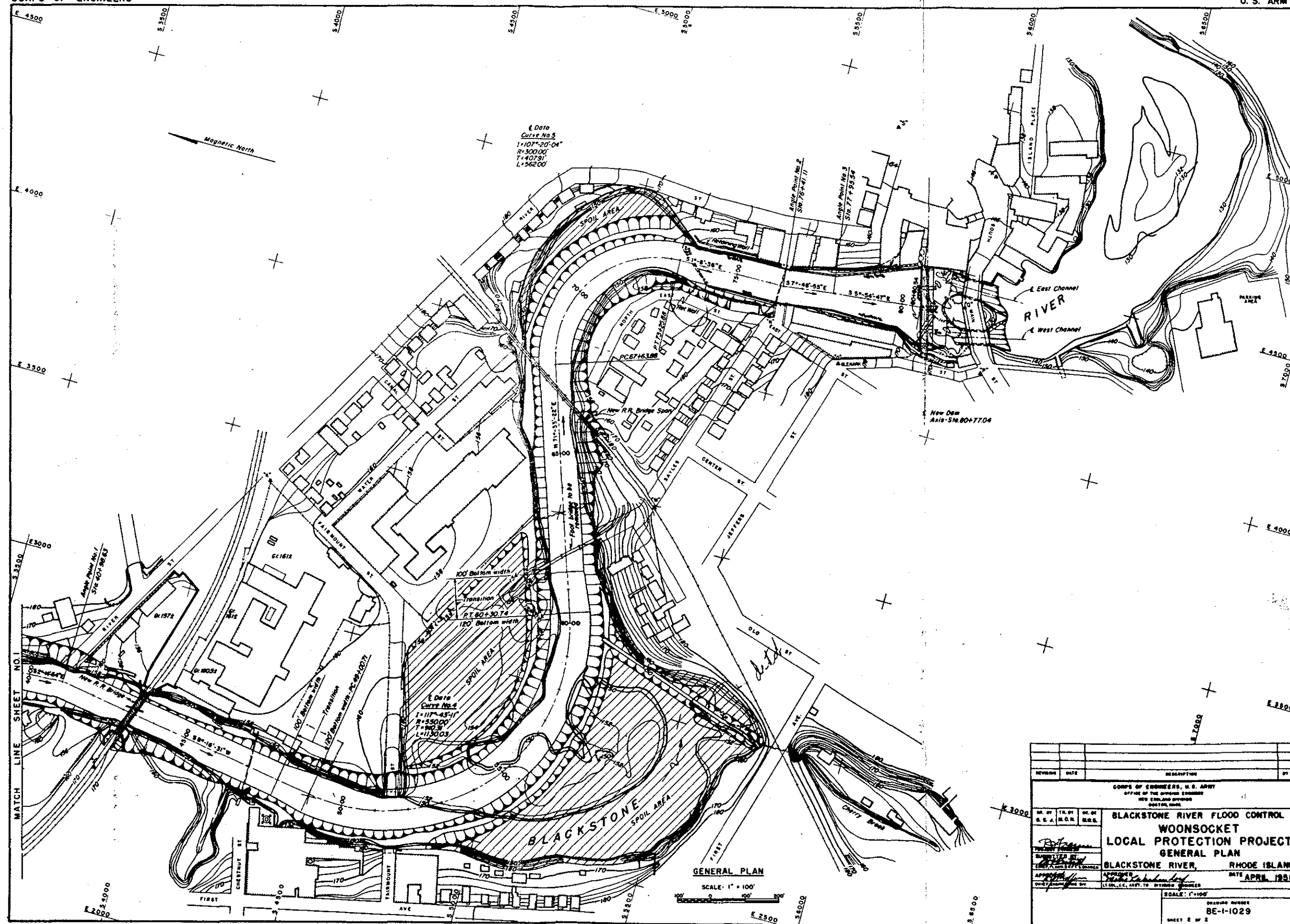


NOTE:
All projects completed
unless otherwise noted.

BLACKSTONE RIVER BASIN Massachusetts & Rhode Island

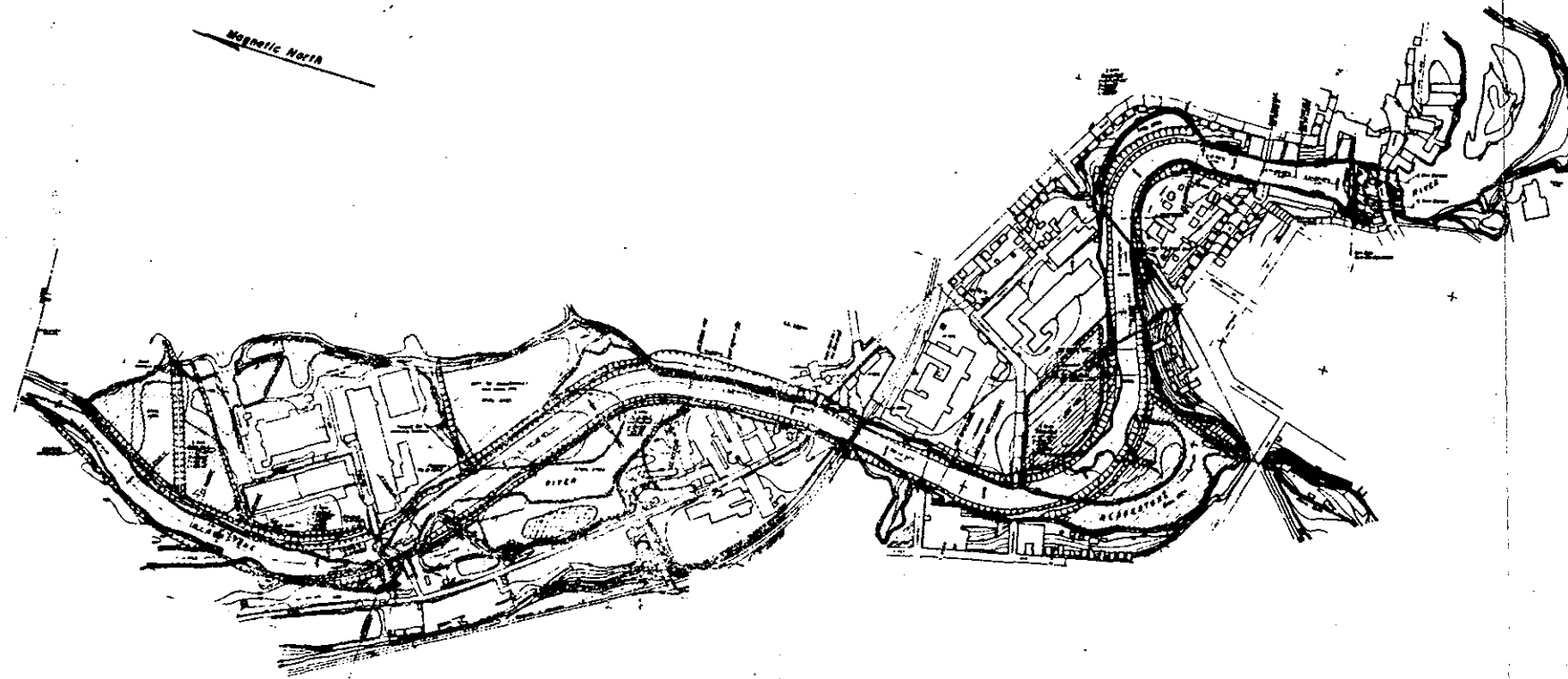
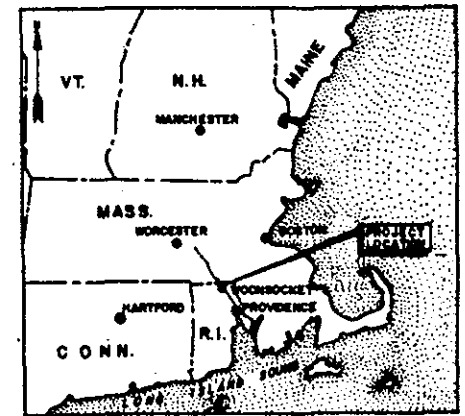




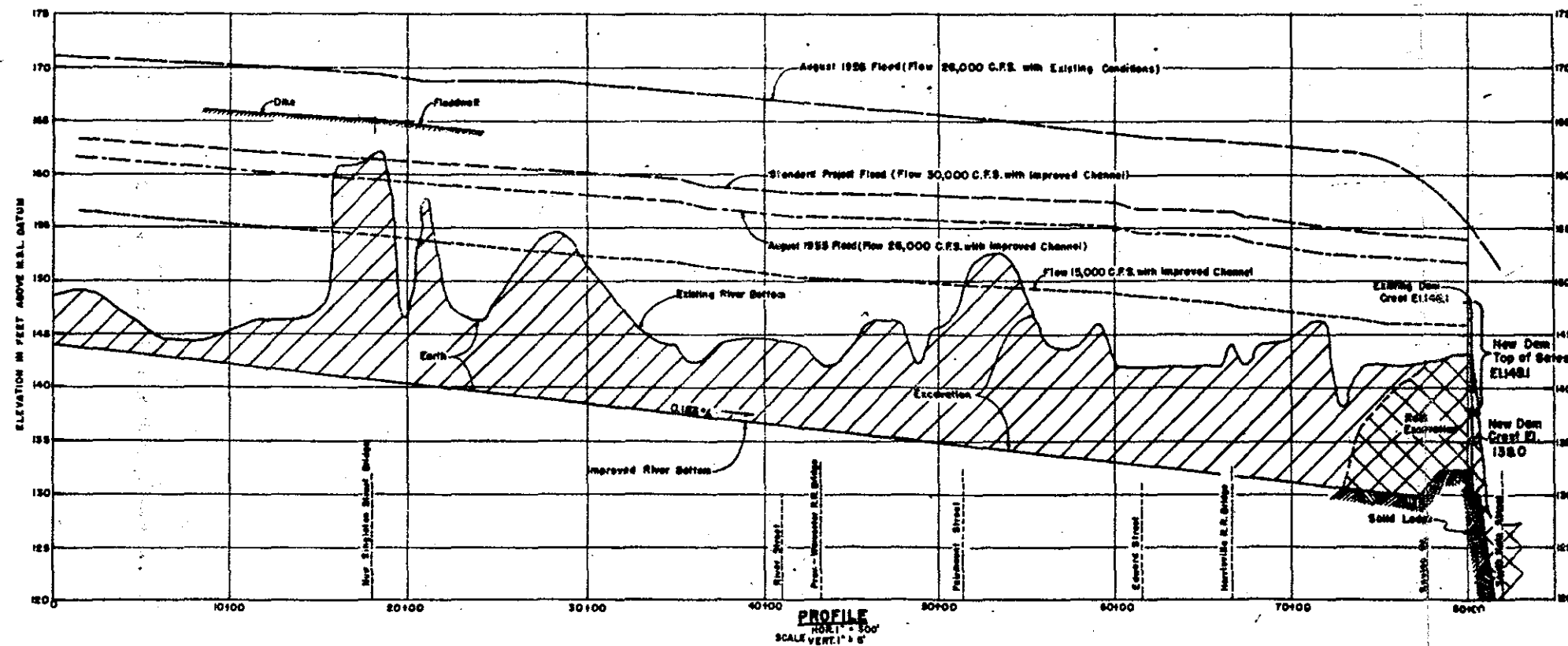


REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY OFFICE OF THE DISTRICT ENGINEER NEW ENGLAND DIVISION PORTLAND, MAINE			
MR. CHIEF OF DISTRICT	MR. DISTRICT ENGINEER	MR. DISTRICT ASSISTANT	MR. DISTRICT ASSISTANT
BLACKSTONE RIVER FLOOD CONTROL WOONSOCKET LOCAL PROTECTION PROJECT GENERAL PLAN BLACKSTONE RIVER, RHODE ISLAND DATE: APRIL 1958			
SCALE: 1" = 100'			DRAWING NUMBER BE-1-1029
SHEET 2 OF 2			

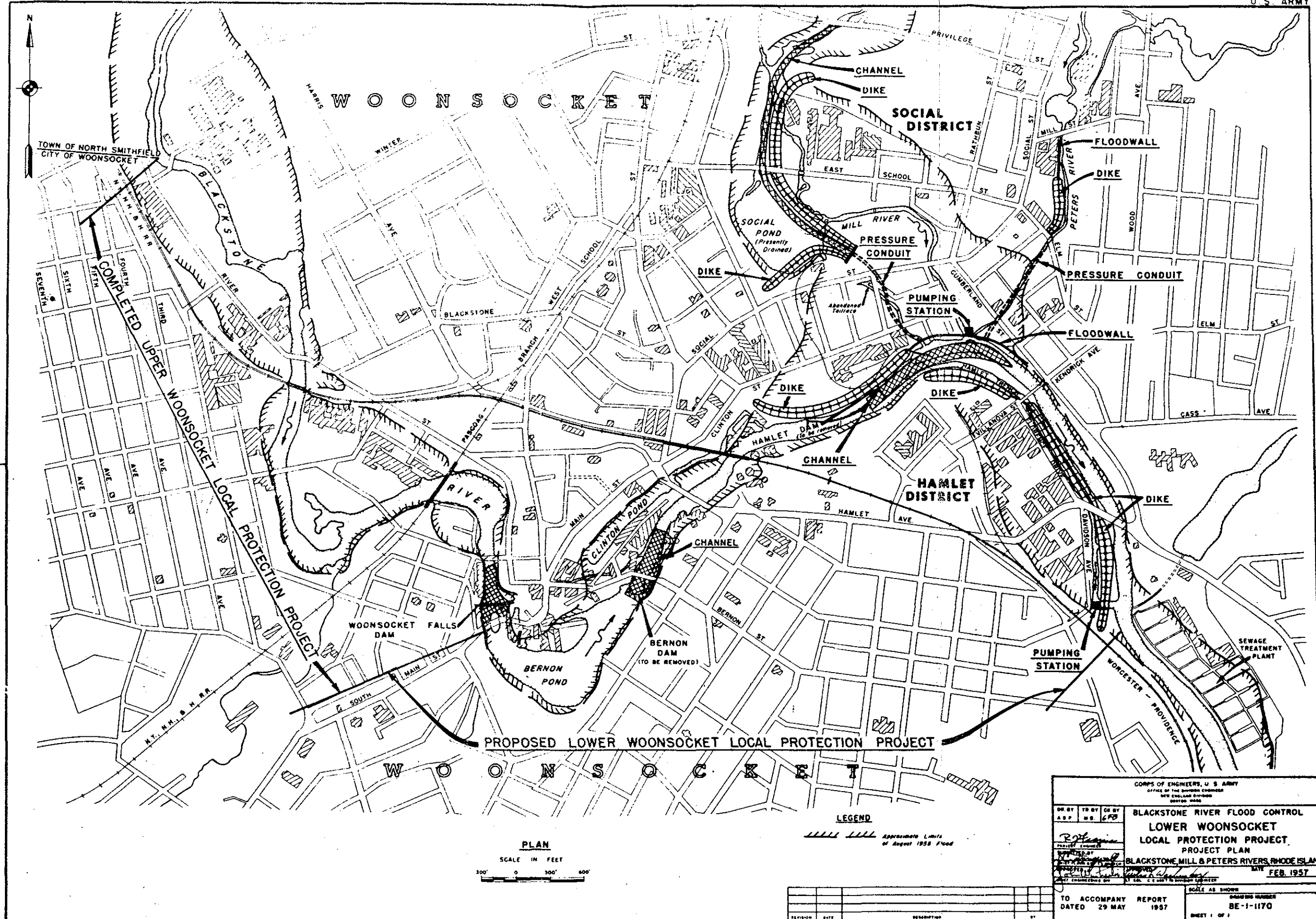
GENERAL PLAN
SCALE IN FEET

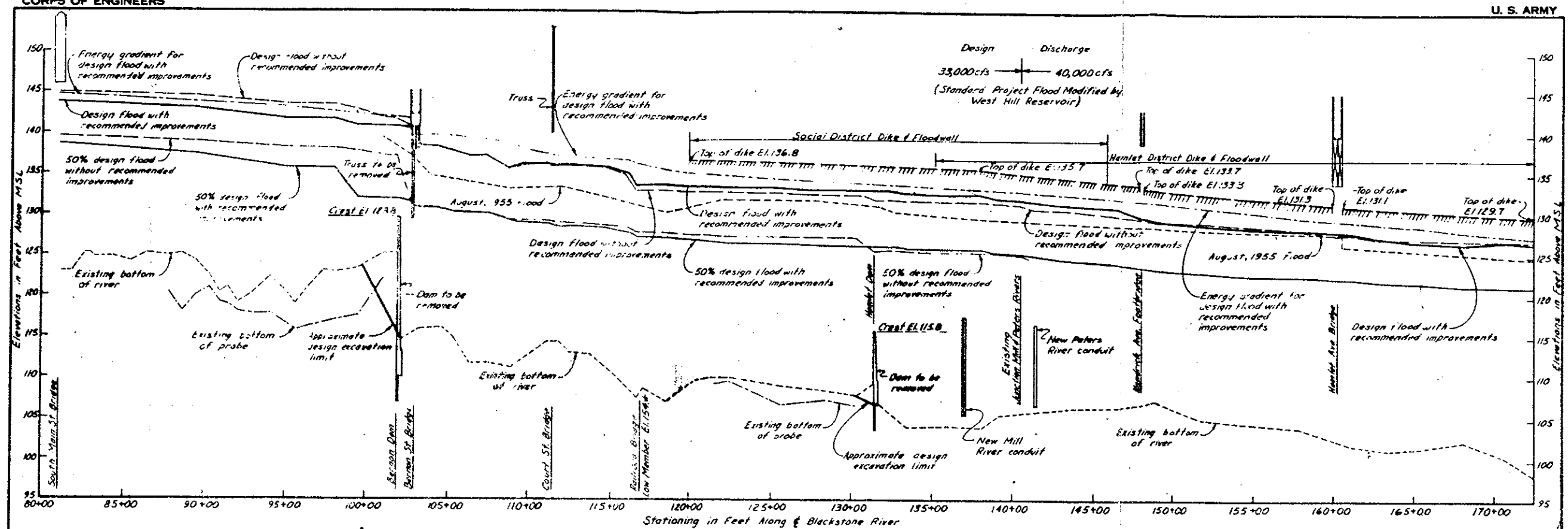
LOCATION MAP

SCALE IN MILES
0 5 10 15 20 25 30

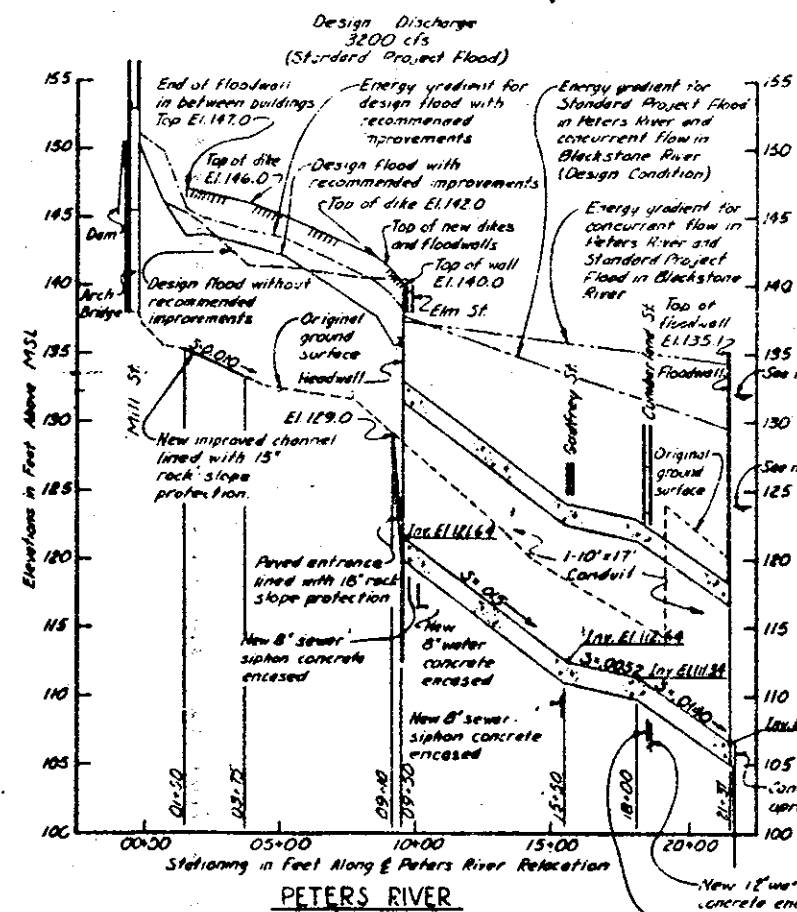
NOTE
See Plate No. 2-5 for profiles from Dam through South Main St. Bridge.

DESIGN	DATE	REVISION	BY
J.P.	10/27		
A.A.H.	11/27		
G.S.B.	12/27		
CORPS OF ENGINEERS, U.S. ARMY OFFICE OF THE DISTRICT ENGINEER NEW HAVEN DIVISION WOODLAND BRIDGE WOODLAND BRIDGE			
BLACKSTONE RIVER FLOOD CONTROL WOONSOCKET LOCAL PROTECTION PROJECT GENERAL PLAN AND PROFILE			
BLACKSTONE RIVER WOODLAND BRIDGE MAY, 1938			
SCALE AS SHOWN SHEET 1 OF 1			

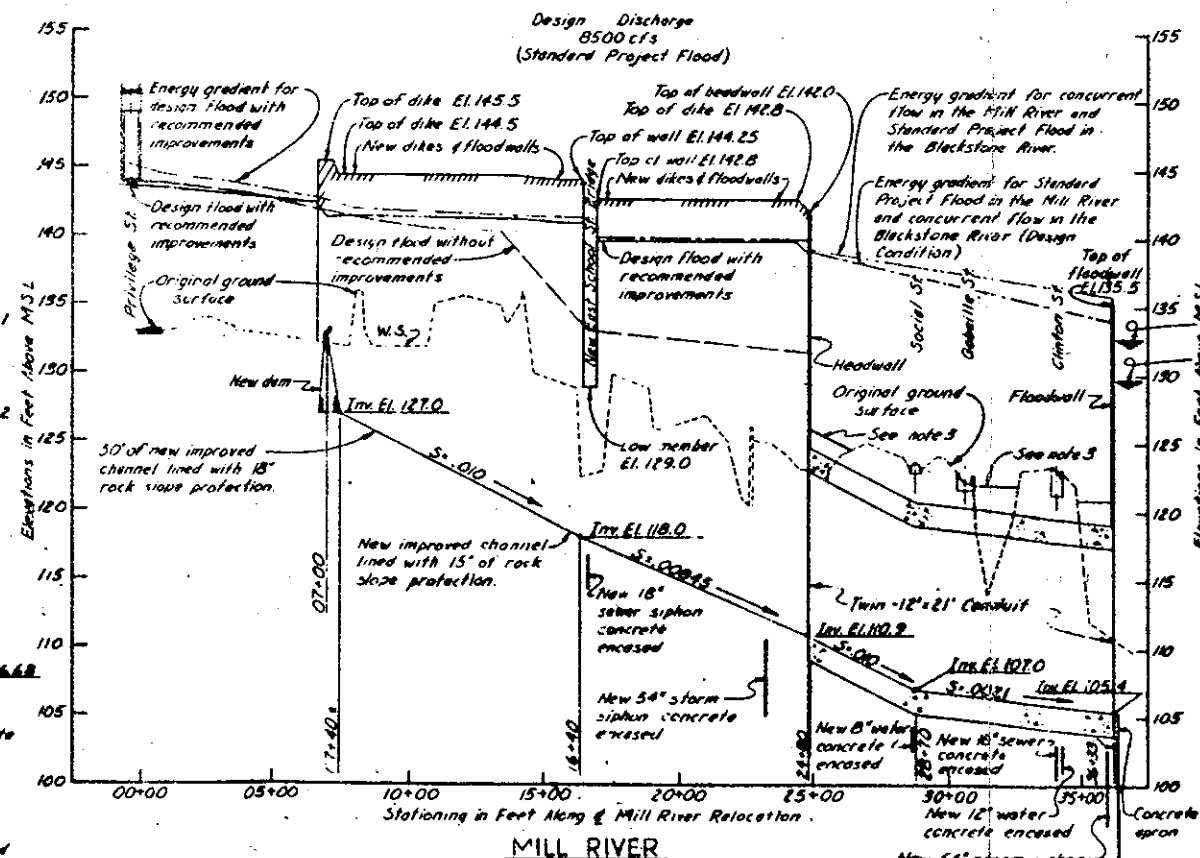




BLACKSTONE RIVER



PETERS RIVER



MILL RIVER

NOTES

1. Maximum tailwater with Blackstone River at standard project flood.
2. Tailwater of Blackstone River with standard project flood in Mill or Peters River (design condition).
3. Proposed grade (fill).

GRAPHIC SCALES

Horizontal 1" = 250' 0" 125' 500'
Vertical 1" = 5' 0" 2.5' 5' 10'

CHARLES A. BARNES & ASSOCIATES PROVIDENCE, R.I. BOSTON, MASS. NEW YORK, N.Y. ENGINEERS		U.S. ARMY ENGINEER DIVISION, NEW ORLEANS CORPS OF ENGINEERS NEW ORLEANS, LOUISIANA	
BLACKSTONE RIVER FLOOD CONTROL LOWER WOONSOCKET			
PROFILES			
BLACKSTONE, MILL & PETERS RIVERS		RHODE ISLAND	
SCALE AS SHOWN ON SHEET			